AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of providing a set of continuous tuning regions from a discontinuously tuned laser, the method comprising the steps of:

providing a wavelength reference having at least first and second resonance peaks[[,]];

sweeping the laser across a pre-determined wavelength range of the wavelength reference[[,]]; and

defining, within the laser sweep, one or more regions of continuous tuning operation of the laser, each of the regions corresponding to a response of the laser between adjacent resonance peaks of the wavelength reference, wherein the regions of continuing tuning operation of the laser are defined by:

calibrating the laser so as to provide a range of currents with no mode jumps;

selecting continuous regions with a first frequency overlap that have a resonance peak in the wavelength response from their beginnings and ends; and

setting the currents whilst sweeping through those wavelengths so as to provide a smoothly transitioning wavelength sweep.

2. (Original) The method as claimed in claim 1 wherein the one or more regions of continuous tuning operation are adjacent to one another.

3. (Original) The method as claimed in claim 1 wherein the one or more regions of continuous tuning operation are displaced from one another across the pre-determined wavelength range.

4. (Original) The method as claimed in claim 1 further comprising the step of:

stitching two or more regions to one another so as to form a usable tuning data set.

5. (Currently amended) The method as claimed in claim 4 wherein the step of stitching the two or more regions to one another is effected by:

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[[c]] a. creating a lookup table of regions that have continuous tuning over a first frequency region with a frequency overlap on either side with the previous and next continuous tuning regions,

[[d]] b. asserting a control signal to denote a continuous region when the first resonance peak is detected,

[[e]] c. de-asserting the control signal and jumping to the next continuous tuning region when the next resonance peak is found within this continuous tuning region, and

d. repeating the above steps (b-c) until a sufficient range of wavelength has been swept.

6. (Cancelled)

7. (Currently amended) The method as claimed in claim ~~6~~ 1 wherein the step of setting the currents is provided by filtering and/or shaping.

8. (Original) The method as claimed in any preceding claim further comprising the step of assigning a frequency (F_{meas}) or wavelength (λ_{meas}) value to discrete points within the continuous region of operation of the laser device, the value being assigned by:

measuring the tine from the resonance peak at the beginning of the sweep to the measurement instant (T_{meas}),

measuring the time required to sweep between adjacent resonance peaks ($T_{segment}$) and

calculating the value by extracting a value for T_{meas} from $T_{segment}$.

9. (Original) The method as claimed in claim 8 wherein the value is a frequency value (F_{meas}) and the wavelength reference is an etalon, the frequency being calculated using the equation:

$$F_{meas} = FSR_{Etalon} * \frac{T_{meas}}{T_{segment}} + F_{SegmentStart}$$

where FSR_{Etalon} is the free spectral range of the reference etalon and $F_{SegmentStart}$ is the absolute frequency of the first resonant etalon peak in the segment.

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10. (Original) The method as claimed in any preceding claim further including the step of using the laser device as a reference source for a second device.

11. (Original) The method as claimed in any preceding claim including the step of measuring the output power of the laser and using this measurement to normalise the received DUT power.

12. (Original) The method as claimed in any preceding claim further comprising the step of using the regions of continuous tuning operation to define the spectral characteristics of a second laser device.

13. (Original) The method as claimed in any one of claims 1 to 10 further comprising the step of using the regions of continuous tuning operation to provide an optical spectrum analyser.

14. (Original) The method as claimed in any preceding claim wherein the wavelength reference is provided by one or more of the following:

a fabry perot etalon,

a gas cell,

fibre bragg grating,

notch filter,

a reflective fabry perot etalon, and

optical filter.

15. (Original) The method as claimed in any preceding claim wherein any portion of the resonance peak is used to determine the location of the resonance peak.

16. (Original) A method as claimed in any preceding claim wherein the ambient temperature of the laser system is measured, based on this measurement the temperature of the laser is adjusted to keep the laser chip at a constant temperature.

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17. (Currently amended) A method as claimed in any of the preceding claims where the temperature of the laser is controlled by the following steps:

a. Measuring the time to a resonance peak from the start of a continuous wavelength sweep

b. Comparing this time to an expected time

[[f]] c. Adjusting the temperature of the laser based on the difference between the measured and expected times

[[g]] d. Returning to step (a) and repeat if necessary.

18. (Currently amended) A method of stitching two or more regions to one another so as to form a usable tuning data set for a tunable laser comprising the steps of:

a. creating a lookup table of regions that have continuous tuning over a first frequency region with a frequency overlap on either side with the previous and next continuous tuning regions;

b. asserting a control signal to denote a continuous region when a resonance peak is detected in the frequency region;

c. de-asserting the control signal and jumping to the next continuous tuning region when a next resonance peak is found within this continuous tuning region, wherein gain of the receiver is controlled dynamically from continuous tuning region to continuous tuning region; and

d. repeating the above steps (b-c) until a sufficient range of wavelength has been swept.

19. (Cancelled)

20. (Currently amended) A method as claimed in claim[[s]] 18 ~~or 19~~ wherein a delay is implemented between a control signal generated from the resonance peaks and a second control signal used to measure a photodiode.

21. (Original) A method as claimed in any of claims 18 to 20 wherein the control signal is used to assert/de-assert receiver sampling rate.

22-25. (Cancelled)

26. (Currently amended) A system adapted to provide a set of continuous tuning regions from a discontinuously tuned laser, the system comprising:

a wavelength reference having at least first and second resonance peaks associated therewith;

a tunable laser;

means for sweeping the laser across a pre-determined wavelength range of the wavelength reference; and

means for defining, within the laser sweep, one or more regions of continuous tuning operation of the laser, each of the regions corresponding to a response of the laser between adjacent resonance peaks of the wavelength reference, wherein the regions of continuing tuning operation of the laser are defined by:

means for calibrating the laser so as to provide a range of currents with no mode jumps;

means for selecting continuous regions with a first frequency overlap that have a resonance peak in the wavelength response from their beginnings and ends; and

means for setting the currents whilst sweeping through those wavelengths so as to provide a smoothly transitioning wavelength sweep.

27. (New) A system configured to provide a set of continuous tuning regions from a discontinuously tuned laser, the system comprising:

data storage;

at least one processor;

program code stored in the data storage and executable by the at least one processor to:

provide a wavelength reference having at least first and second resonance peaks;

sweep the laser across a pre-determined wavelength range of the wavelength reference; and

define, within the laser sweep, one or more regions of continuous tuning operation of the laser, each of the regions corresponding to a response of the laser between adjacent resonance peaks of the wavelength reference, wherein the regions of continuing tuning operation of the laser are defined to:

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calibrate the laser so as to provide a range of currents with no mode jumps;

select continuous regions with a first frequency overlap that have a resonance peak in the wavelength response from their beginnings and ends; and

set the currents whilst sweeping through those wavelengths so as to provide a smoothly transitioning wavelength sweep.

28. (New) A method of providing a set of continuous tuning regions from a discontinuously tuned laser, the method comprising the steps of:

providing a wavelength reference having at least first and second resonance peaks;

sweeping the laser across a pre-determined wavelength range of the wavelength reference;

defining, within the laser sweep, one or more regions of continuous tuning operation of the laser, each of the regions corresponding to a response of the laser between adjacent resonance peaks of the wavelength reference; and

stitching two or more regions to one another so as to form a usable tuning data set by:

a. creating a lookup table of regions that have continuous tuning over a first frequency region with a frequency overlap on either side with the previous and next continuous tuning regions;

b. asserting a control signal to denote a continuous region when the first resonance peak is detected;

c. de-asserting the control signal and jumping to the next continuous tuning region when the next resonance peak is found within this continuous tuning region; and

d. repeating the above steps (b-c) until a sufficient range of wavelength has been swept.

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